

**FACTORS PREDISPOSING HEALTH WORKERS TO NOSOCOMIAL
INFECTIONS AT KAMPALA INTERNATIONAL UNIVERSITY
TEACHING HOSPITAL**

SUBMITTED BY

IRENE NAMATOVU

BMS/0031/71/DU

**A RESEARCH REPORT SUBMITTED TO THE SCHOOL CLINICAL MEDICINE AND
DENTISTRY OF KAMPALA INTERNATIONAL UNIVERSITY IN PARTIAL
FULLFILMENT FOR THE AWARD OF BACHELORS DEGREE IN MEDICINE AND
SURGERY**

OCTOBER 2014

DECLARATION

To the best of my knowledge and belief, the work presented in this proposal is my own initiative and has not been submitted in substance anywhere. The use of literature from other sources has been accredited to their respective authors.

Signature/Date...../.....

Candidate: NAMATOVU IRENE

Reg. number: BMS/0031/71/DU

This proposal has been produced under the guidance and supervision of the university supervisor,

Signature/Date...../.....

PROFESSOR ALINA ,

MY SUPERVISOR

ACKNOWLEDGEMENTS

I wish to acknowledge KIU-WC for giving me the chance pursue a Bachelors degree in Medicine and Surgery

I would also wish to pass my sincere gratitude to the faculty clinical medicine and dentistry staff for the support during the training; DR.ALINA, DR.AKIB, PROF, LAZARO, PROF,EDUARDO. Deep appreciation to my supervisor- PROF, ALINA and DR. BAGUMA STEVEN for the guidance and supervision throughout the process of writing this research. High appreciation also goes to the medical staff of KIU-TH with whom I carried out my study during the research.

I am also gratefully indebted to my family for their love, support and encouragement throughout this academic year.

Above all I give glory to the almighty God who is my source of wisdom.

ABSTRACT

Introduction

Occupational infections particularly hospital-acquired infections are a serious problem in the healthcare industry worldwide. Health care workers are often exposed and are at risk of acquiring nosocomial infections during the process of providing health care.

Aim of the study

The aim of this study was to investigate the factors predisposing health workers to nosocomial infections at KIUTH.

Methodology

A descriptive cross sectional study was conducted among health workers at KIUTH. A total of 90 respondents were interviewed using questionnaires by random sampling.

Principal Findings

The study found out that the most common NIs among the health care workers were RTIs (65.5%), the greatest risk factor for acquiring a nosocomial infection was insufficient equipment (43.3%), 86.6% of the respondents used personal protective equipment always, 48.9% of the respondents found hand hygiene as the infection control practice easiest to use, 90% of the respondents were motivated by personal safety and 50% did not comply with infection control measures due to inadequate supplies.

Conclusions/Recommendations

In conclusion, the health care workers at KIUTH were aware of the aspects concerning NIs. The most common occupational infection occurring among HCWs were RTIs, specifically TB and the most common risk factor for acquiring a nosocomial infection is insufficient equipment and lack of infection control guidelines.

The study then recommended that health care workers at the hospital be provided with adequate and relevant personal protective equipment such as respirators and hand hygiene facilities, ongoing education and training of HCWs on task-specific needs for safety integrated with implementation of infection control and prevention policy guidelines by the hospital administration.

TABLE OF CONTENTS

Declaration.....	i
Dedication.....	ii
Acknowledgement.....	iii
Abstract.....	iv
Table of contents.....	vi
List of tables.....	viii
List of figures.....	viii
List of acronyms.....	ix
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background information.....	1
1.2 Problem statement.....	2
1.3 Study objectives.....	3
1.3.1 Broad objectives.....	3
1.3.2 Specific objectives.....	3
1.4 Significance of the study.....	3
1.5 Research questions.....	4
CHAPTER TWO: LITERATURE REVIEW.....	5
2.0 Introduction.....	5
2.1 The Risks of Nosocomial Infections.....	5
2.2 Transmission of HCAIs.....	6
2.3 Nosocomial infection Prevention and Control.....	7
CHAPTER THREE: METHODOLOGY.....	11
3.0 Introduction.....	11
3.1 Study area.....	11
3.2 Study population.....	11

3.3	Study design.....	11
3.4	Sample size determination.....	12
3.5	Sampling method.....	12
3.6.1	Inclusion criteria.....	12
3.6.2	Exclusion criteria.....	12
3.7	Data collection methods.....	13
3.8	Data analysis methods.....	14
3.9	Data quality control.....	14
3.10	Data presentation methods	14
3.11	Study limitations.....	15
3.12	Ethical considerations.....	15
CHAPTER FOUR:		16
4.0	General Introduction.....	16
4.1	Bio Data.....	16
4.2	Level of Awareness of respondents on Nosocomial Infection.....	19
4.3	Attitudes and Risks of Respondents towards Nosocomial Infection.....	22
4.3	IC Practices Used by Respondents and their compliance with these Practices....	24
CHAPTER FIVE: DISCUSSION		27
5.0	Discussion of results.....	27
CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS.....		30
6.1	Conclusions.....	30
6.2	Recommendations.....	31
References.....		32
Appendix 1: Research questionnaire.....		33
Appendix 2: Proposed budget.....		41

List of tables

Table 1: Distribution of respondents by age.....	16
Table 2: Distribution of respondents by cadre.....	17
Table 3: Distribution of participants by their sources of information.....	19
Table 4: Distribution of respondents by identifying modes of transmission.....	21
Table 5: Distribution of respondents by their beliefs on NIs.....	22
Table 6: Distribution of respondents by the common risk factors to NIs.....	23
Table 7: Distribution of respondents by the common IC measures used.....	24
Table 8: Distribution of respondents by easy-to-use IC practices.....	25
Table 9: Distribution of respondents by reasons for non compliance with IC practices.....	26

List of figures

Figure 1: Distribution of respondents by gender.....	17
Figure 2: Distribution of respondents by the duration of service at KIUTH.....	18
Figure 3: Distribution of respondents by examples of common NIs.....	20
Figure 4: Distribution of respondents by frequency of using protective gears.....	25

LIST OF ACRONYMS

CDC.....	Centres for Disease Control and prevention
HBV.....	Hepatitis B Virus
HCAI.....	Health-Care Associated Infection
HCV.....	Hepatitis C Virus
HCW.....	Health Care Workers
HIV.....	Human Immuno-deficiency Virus
IC.....	Infection Control
KIUTH.....	Kampala International University Teaching Hospital
LMIC.....	Low and Middle Income Countries
MRSA.....	Methicillin Resistant Staphylococcus Aureus
NIs.....	Nosocomial Infections
OSHA.....	Occupational Safety and Health Administration
PPE.....	Personal Protective Equipment
VRE.....	Vancomycin Resistant Enterococci
RTIs.....	Respiratory Tract Infections
WHO.....	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Nosocomial infections also known as health-care associated infections is a major global safety concern for both health-care professionals and patients, **(Pittet and Donaldson, 2005)**.

HCAI is defined as an infection occurring in a patient during the process of care in a hospital or other health-care facility that was not manifest at the time of admission and may appear even after discharge. The duration before acquiring the infection is seven days. But it may vary depending on the infecting organism; say fungus, bacteria, or virus. Viral infections have a shorter duration of infection compared to the rest.

HCAI also includes occupational infections among facility staff and these include infections acquired during health care delivery, which are by far the most frequent adverse events in health care, **(Pittet et al, 2008)**.

According to OSHA-Washington 2011, healthcare workers (HCWs) are occupationally exposed to a variety of infectious diseases during the performance of their duties. The delivery of healthcare services requires a broad range of workers, such as physicians, nurses, technicians, among others. Moreover, these workers can be found in a variety of workplace settings including hospitals, outpatient clinics and emergency response settings. The diversity among HCWs and their workplaces makes occupational exposure to infectious diseases especially challenging. HCWs need protection from these workplace-acquired infections but because their job is to care for the sick and injured, HCWs are often viewed as “immune” to injury or illness. Their patients

come first. They are often expected to sacrifice their own well-being for the sake of their patients. Indeed, having health protecting HCW has the added benefit to contributing to quality patient care and health system strengthening. Some of the same measures to protect patients from infections, such as adequate staffing also protect HCWs from injury.

1.2 Problem Statement

In spite of global, national, regional, and local initiatives to develop a skilled health workforce to deliver better health outcomes, efforts to reduce nosocomial infection risks for health workers in developing countries are far from sufficient to protect their health, (**OSHA, 2011**). Particularly for developing countries facing a health workforce shortage, saving lives should not be accomplished by sacrificing providers' own lives.

Additionally, overcrowding and understaffing in hospitals result in inadequate infection control practices, and a lack of infection control policies, guidelines and adequately trained professionals also adds to the extent of the problem, (**WHO, 2011**).

Uganda – being a developing country, it's health care providers are faced by the above challenges and among them are those of KIU-TH. Despite the fact that medical personnel may have been fully equipped with knowledge and equipment to prevent themselves and their patients from acquiring these infections, Nosocomial infection rate is still on the increase. This therefore calls for the study to be done to investigate the factors making the infection rate still high among health workers.

1.3 Study Objectives

1.3.1 Broad objectives

- To determine the factors predisposing health workers to nosocomial infection at KIUTH.

1.3.2 Specific objectives

- To determine health workers' knowledge on nosocomial infections and their prevention.
- To know the use of and adherence to infection control measures towards nosocomial infection among the HCWs.

1.4 Significance of the Study

HCWs are often exposed to infectious agents during the process of providing health care. They are therefore required to know about these HCAIs and how they can prevent themselves from acquiring them. This study is therefore part of the answers required to provide adequate information on the gaps of the HCWs awareness in control of cross infection particularly at KIUTH.

Secondly, the study results will be presented to Faculty of clinical medicine and dentistry as a preliminary requirement to achieve my academic qualification in DEGREE in Clinical Medicine and SURGERY at Kampala International University, this will provide an opportunity to the University hospital to expound more on factors that increase risk to nosocomial infection among the HCWs at KIUTH.

1.5 Research Questions

1.5.1 Do the health workers know about nosocomial infection?

1.5.2 What infection control measures are used by the HCWs to prevent nosocomial infections?

1.5.3 What are the HCWs' levels of compliance with the infection control measures?

CHAPTER TWO: LITERATURE REVIEW

2.0 General Introduction

This chapter introduces the reader to key information about the work previously carried out by other researchers, policy documents as well as non published articles and guidelines available from local and international authorities. The literature presented concentrates only on the findings relevant to the study objectives presented in chapter one.

2.1 The risks of nosocomial infections

The risk of nosocomial infection in developing countries is 2-20 times higher than in developed countries, (**Pittet and Benedetta, 2007**).

Amongst HCWs, protecting them especially in developing countries, where even the basics of medical care are difficult to provide and where the protection of health care workers does not appear on any list of health care priorities, is a formidable challenge. Clearly, health care workers in these countries are at serious risk of infection from several pathogens like *M. tuberculosis* and other blood borne pathogens — particularly Hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV because of the high prevalence of such pathogens in many poorer regions of the world.

In many hospitals of Low and Middle Income Countries adequate supplies to control infection are not available, (**Graves et al, 2008**). Patients and their families may be required to provide care materials such as syringes, surgical gowns, and drugs; moreover compliance with hand

hygiene is often low. Overcrowding and understaffing results in decreased hand hygiene compliance and the frequent movement of patients and staff between hospital wards results in an increased risk of transmission of multidrug-resistant microorganisms

According to Occupational Safety and Health Administration 2011, The lack of commitment to healthcare by policy-makers in the developing world and the often disproportionate allocation of funds to the priorities set by providers, frequent corruption and non formal payments, Information systems that are not fully developed, limited grants available for research and no legislation mandating accreditation of hospitals or infection control programmes plus the highly variable and minimal in-service training for employee all add to the list of risk factors.

HCWs in or outside hospitals who have contact with patients, body fluids, or specimens have a higher risk of acquiring or transmitting infections than do those who have only brief casual contact with patients and their environment such as beds, furniture, bathrooms, food trays, medical equipment, (**Jagger et al, 2001**).

2.2 Transmission of HCAs

Among patients and health care personnel, microorganisms are spread to others through four common routes of transmission; contact (direct and indirect), respiratory droplets, airborne spread, and common vehicle, (**Perl et al, 2005**).

Contact transmission. This is the most important and frequent mode of transmission in the health care setting. Organisms are transferred through direct contact between an infected patient

and a susceptible HCW and indirectly when an infected patient touches and contaminates a doorknob, which is subsequently touched by a HCW and carried to another patient.

Respiratory droplets. Droplet-size body fluids containing microorganisms can be generated during coughing, sneezing, talking, suctioning, and bronchoscopy. They are propelled a short distance before settling quickly onto a surface. They can cause infection by being deposited directly onto a susceptible person's mucosal surface like the conjunctivae, mouth, or nose or onto nearby environmental surfaces, which can then be touched by a susceptible person who auto-inoculates their own mucosal surface.

Airborne spread. When small-particle-size microorganisms such as tubercle bacilli, varicella, and rubeola virus remain suspended in the air for long periods of time, they can spread to other people.

Common Vehicle. This applies when multiple people are exposed to and become ill from a common inanimate vehicle of contaminated medications, solutions, devices, or equipment. Common vehicle transmission is likely associated with a unique outbreak setting.

2.3 Infection prevention and control

The CDC published the "Guideline for Infection Control in Hospital Personnel", (**Williams, 1983**). This document focused on the prevention of infections known to be transmitted to and from health care personnel and but there has been ongoing updates to suit today's health system. All HCWs should have access to IC guidelines that advise about the management of an occupational injury, including clear written instructions on the appropriate action to take in the event of a needlestick and other blood or body substance exposures involving either patients or

other HCWs. They are encouraged to report occupational exposures immediately and all testing procedures and follow-up treatment should be fully documented.

Standard precautions

According to the CDC recommendations for health care infection control practices, 2002, the implementation of standard precautions minimises the risk of transmission of the infection from patient-to-clinician, clinician-to patient and patient-to-patient, even in high-risk situations.

Examples of standard precautions are; personal hygiene practices particularly hand-washing, the use of personal protective equipment, aseptic techniques, the safe disposal systems for sharps and contaminated matter, the adequate sterilisation of reusable equipment, and environmental controls. These are recommended for the care and treatment of all patients and in the handling of blood, including dried blood, all other body substances, secretions and excretions regardless of whether they contain visible blood, Non-intact skin and mucous membranes.

Hand hygiene

Hand-washing is generally considered the most important hygiene measure in preventing the spread of infection, (**WHO, 2009**). It should occur before and after each clinical contact with a patient, before and after eating, after using the toilet, before and after using gloves, after contact with used equipment and immediately following contact with body substances.

It is important to note that gloves are not a substitute for effective hand-washing, (**Wilkins, 1999**). A routine hand-wash should include the removal of jewellery and the use of a cleaning solution and water for 15 to 20 seconds, followed by drying with a single-use towel. Alcohol-based hand rubs can be used in the absence of appropriate washing facilities.

Preparations used for hand hygiene include; Plain (non-antimicrobial) soaps, alcohols and chlorhexidine among others.

Personal protective equipment (PPE)

PPE refers to wearable equipment that is intended to protect HCWs from exposure to or contact with infectious agents, (CDC, 2002). Examples include gloves, gowns aprons and protective eye wears. The type of protective equipment required depends on the nature of the procedure, the equipment used and the skill of the operator.

Gloves

Gloves must be used when handling blood and body substances, performing venepuncture, touching mucous membranes, touching non-intact skin, handling contaminated sharps, performing invasive procedures and cleaning body substance spills any equipment, materials and surface that might have been contaminated by body substances.

Protective eye wear: must be worn during procedures where there is the potential for splashing, splattering or spraying of blood or other body substances. Eye protection therefore provides a barrier to infectious materials entering the eye and is often used in conjunction with other PPE. Common eye protection devices include goggles, face shields, safety glasses and full face respirators.

Impermeable gowns and plastic aprons and foot wear: should be worn to protect clothing and skin from contamination with blood and body substances. These should either be disposable or be used only when caring for a specific patient. Foot wear should be enclosed to protect against injury or contact with sharp objects.

Sterilisation

Sterilisation goes further than just sanitizing. It kills all microorganisms on equipment and surfaces through exposure to chemicals, ionizing radiation, dry heat, or steam under pressure, **(Lautenbach, 2001)**.

Isolation

Isolation precautions are designed to prevent transmission of microorganisms by common routes in hospitals. Because agent and host factors are more difficult to control, interruption of transfer of microorganisms is directed primarily at transmission.

Surface sanitation

Sanitizing surfaces is an often overlooked, yet crucial, component of breaking the cycle of infection in health care environments, **(French, 2009)**. Use of hydrogen peroxide vapor has been clinically proven to reduce infection rates and risk of acquisition where alcohol has been shown to be ineffective.

Educate and Train Healthcare Workers

Training should include both HCW and patient safety, emphasizing task-specific needs. Education and training should be provided upon orientation to the facility and should be repeated regularly to maintain competency.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter presents detailed description of the methods used to collect, analyze and present data. It also describes the study area, design and target population, sampling techniques, sample size, data collection methods data analysis plan, ethical considerations and limitations during the study.

3.1 Study Area

Kampala International University Teaching Hospital (KIU-TH) is located in Ishaka Municipality, Bushenyi District in Western Uganda. It is approximately 360 kilometers by road, southwest of Kampala. It is the only biggest referral and teaching hospital in the district after Mbarara in western region. The hospital provides preventive, promotive, curative and rehabilitative services as inpatient, outpatient or special clinic services. The 5 major disciplines present are: Internal medicine, obstetrics/gynaecology, surgery, psychiatry and paediatrics. It has about 300 professional workers and about 116 non-professional workers.

3.2 Study Population

The participants included the health care workers at KIU-TH of different cadres with varying durations of service at the hospital.

3.3 Study Design

A descriptive Cross-sectional study was done whereby information was collected using self-administered questionnaires that were availed to respondents to fill.

3.4 Sample Size Determination

The sample size was determined by modified formula as used by Fisher et al 1998

$$S = \frac{Z^2 PQ}{D^2} \quad \text{where}$$

S - Desired sample size

Z - Standard deviation at the required degree of accuracy, taken as 1.96 at 95%.

P - Proportion of the population with the desired characteristics.

(P was set at 90 because 90% of health workers are aware of the situation at hand. P=0.9)

Q - Is standardized = 1.0 – P, where P is 0.9

So Q is 1.0 - 0.9 = 0.1

D - Is the degree of error = 5% or 0.05

Calculation;

My confidential level was 79%

My degree of error was 5%

So, if 95% gives 1.96

79% gives $(79 \times 1.96) \div 95 = 1.63$ thus my deviation is 1.63

Z = 1.63, P = 0.9, Q = 0.1, D = 0.05

$$S = \frac{Z^2 PQ}{D^2}$$

$$S = \frac{1.63^2 \times 0.9 \times 0.1}{0.05^2}$$

S = 95

Sample size of 90 respondents was interviewed.

3.5 Sampling Methods

A systematic random sampling technique was used after stratifying the population under study into Doctors, Nurses, Clinical officers, and lab personnel. The participants were achieved through random selection whereby the researcher visited the hospital and whoever was present at the time of visit was interviewed and requested to fill the questionnaires.

3.6 Selection Criteria

3.6.1 Inclusion Criteria

The study included staffs (health care providers) of the various departments of the hospital who have been there for at least a month.

3.6.2 Exclusion Criteria

The major exclusion criteria were;

- Staff that had been in the hospital for less than a month of working
- Health workers on leave, those absent during the time of interview or who did not agree to provide information.

3.7 Data Collection

Data concerning factors predisposing health workers at KIUTH to nosocomial infection was collected using self-administered questionnaires. The questionnaires contained both open and closed ended questions, and were filled by health care workers often in contact with patients in the different departments.

3.8 Data Analysis Methods

The data was checked for completeness, manually tallied, scientific calculator was used in calculating percentages and Microsoft excel 2007 for graphic work.

3.9 Data Quality Control

In order to reduce errors resulting from wrong interpretations

- Random selection of study participants was used in the field.
- Editing of questionnaires was done while still within the hospital premises and any missing information were corrected before leaving the field.

3.10 Data Presentation

Data from the questionnaires was tallied and presented in frequency tables, percentages, pie charts and bar graphs.

3.11 Study Limitation

Limitations to this study were as follows;

- A number of health care workers declined due to their busy schedule.
- Some health workers are only part time workers in the hospital so were very scarce.
- Insufficient funds and limited time.

3.12 Ethical Considerations

To ensure acceptability into the Hospital such that the proposed research could be carried out, an introductory letter was obtained from the training Institution, addressed to the administrative authority of the Hospital.

Verbal consent was also obtained from each respondent after explaining the purpose of the study and study participants had the right to withdraw from the study at any time during the study.

Confidentiality was observed by avoiding the use of names.

CHAPTER FOUR: STUDY FINDINGS

4.0 General Introduction

This chapter presents the findings from the study carried out at KIUTH on factors predisposing health workers to nosocomial infections within the hospital. The findings were presented using tables, bar graphs and pie charts and other figures.

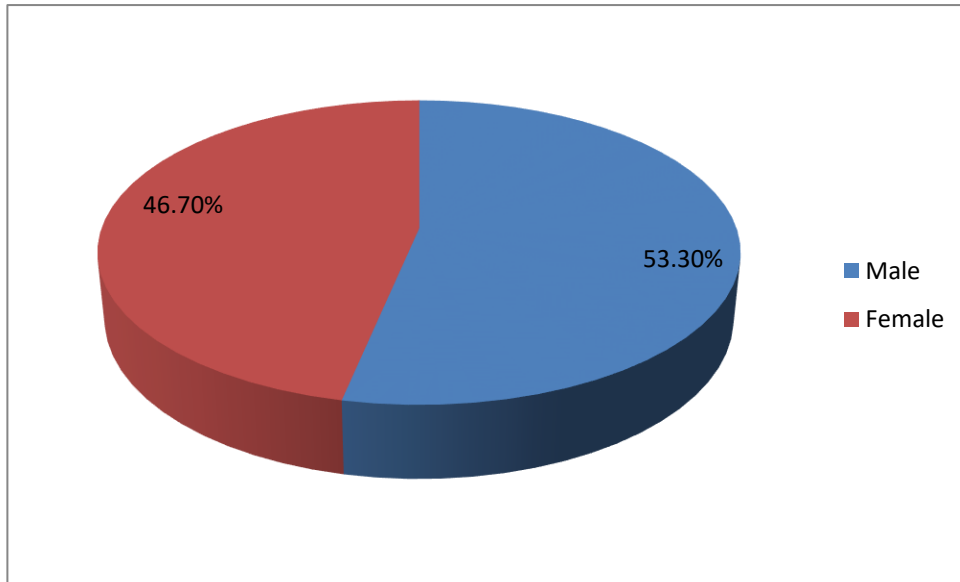
4.1 Bio Data

Table 1: distribution of respondents by age

Age	Frequency	Percentage (%)
21 -30	13	14.4
31 – 40	45	50.0
>40	32	35.6
Total	90	100

Most of the respondents were between 31 – 40 years of age with 45(50.0%), followed by 32(35.6%) of the respondents above 40 years old and 13(14.4%) between 21-30.

Figure 1: Distribution of respondents by gender



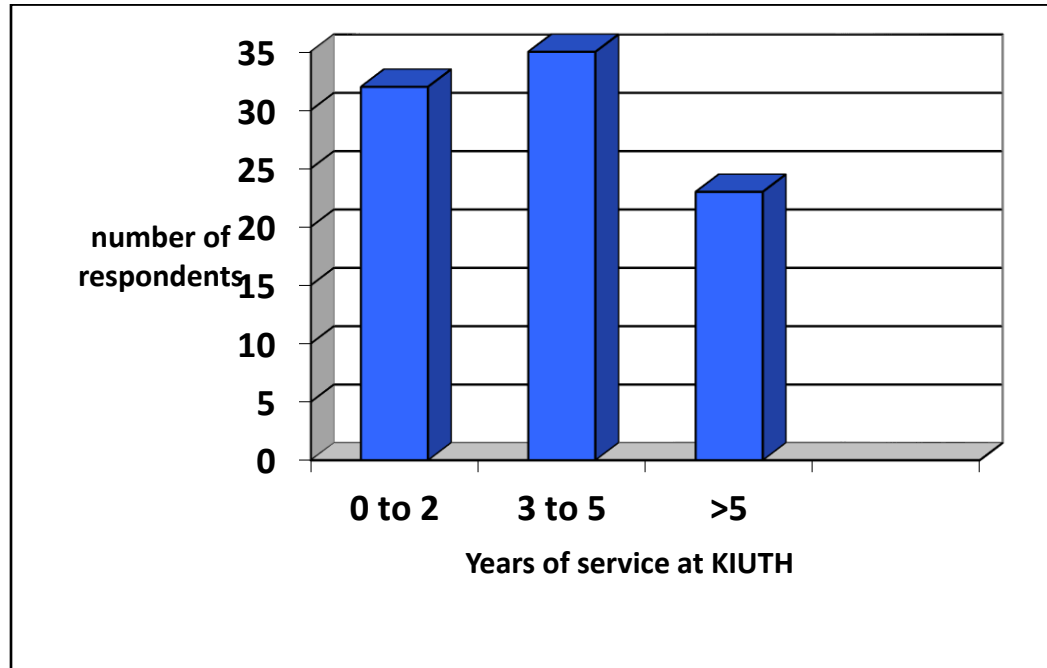
Most of the respondents were males with 53.3% while females constituted 46.7%

Table 2: Distribution of Respondents by Cadre

Cadre of health workers	Number of respondents	Percentage (%)
Doctors	15	16.7
Nurses	47	52.2
Clinical officers	5	5.5
Lab personnel	6	6.7
Others	17	18.9

According to this study, majority of the respondents were nurses with 47(52.2%), followed by other health workers like interns, midwives, surgeons, anesthetists, dentists and ophthalmologists who constituted up to 17(18.9%) respondents, Doctors were 15(16.7%), Lab personnel were 6(6.7%) and the least were clinical officers with only 5(5.5%).

Figure 2: Distribution of respondents by period of service at the hospital



Most of the respondents have been in practice for 3 - 5 years with a number of 35(38.9%), followed by those of 0 – 2 years in service with 32 (35.6%) and the least were those who had worked for over 5 years constituting of 23(25.5%) respondents.

4.2 Level of awareness of Respondents on Nosocomial Infections

The study established that 100% of the health workers were aware of nosocomial infection.

Table 3: Health workers' sources of information

Source	Frequency	Percentage (%)
Educational courses	70	77.8
Scientific journals	2	2.2
Colleagues at work	5	5.6
Workshop/training	13	14.4
Total	90	100

Out of the 90 respondents, majority obtained the information from educational courses with a response of 70, 13 from a workshop/training, 5 from colleagues at work and 2 from scientific journals.

All the respondents were aware that nosocomial infections are those infections that can be acquired while within the hospital.

Figure 3: Examples of Common NIs Known to Respondents

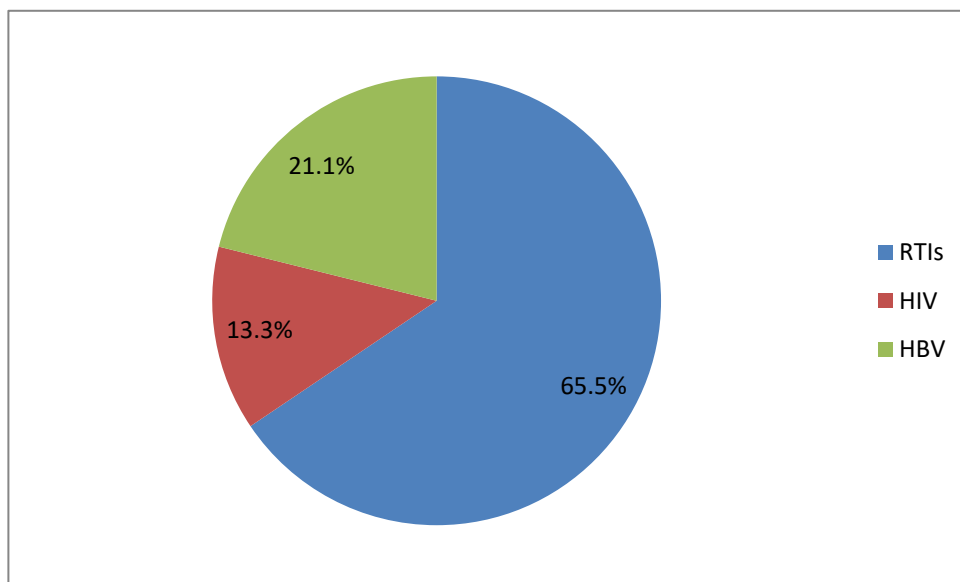


Figure 4 above shows that majority of the respondents identified RTIs as the most common NIs in the hospital with 59(65.5%), followed by HIV with 19 (21.1%) and lastly Hepatitis B with 12 (13.3%). The most common RTIs mentioned include TB with 39 (42.9%), pneumonia with 32 (35.9%) and lastly cough and flu with 20 (22.1%) respondents.

Other NIs highlighted by the health workers were UTIs, skin infections like scabies, chicken pox and sepsis.

According to the study, 100% of the respondents had information on how NIs can be transmitted as presented in table 4 below.

Table 4: Frequent modes of transmission

Mode of transmission	Percentage (%)
Contact transmission	80
Droplet/airborne transmission	20
Common vehicle transmission	0
Total	100

4.3 Attitudes and risks of Respondents towards Nosocomial Infection

Out of the 90 health workers interviewed, (81) 90% had different beliefs concerning Health Care Associated Infections while (9) 10% had none. Below are some of the beliefs highlighted.

Table 5: Respondents beliefs about HCAIs

Respondents' beliefs about NIs	Percentage (%)
Infection control guidelines should be put in place and Implemented if effective control is to be achieved.	56.7
They can be prevented by observing infection control measures like use of protective equipment e.g. gloves	23.3
Are mainly transmitted by coming into contact with infected material like blood, sputum	7.8
They can be acquired from stubborn patients whose intention is to transmit it to you	10
Both health workers and patients are at risk of HCAIs	2.2
Total	100

According to the study, 52 (57.8%) of the health workers had never suffered from or been exposed to HCAIs. However, 38(42.2%) had suffered from or been exposed to such infection and mostly highlighted respiratory tract infections and blood borne pathogens like HIV and HBV. In these cases, some of the health workers were exposed or acquired the infection through talking one on one with patients, needle stick injuries, blood splashes and contact with broken skin.

Most of them responded by washing and cleaning exposed areas with antiseptics then later started on the process of prophylaxis initiation like PEP.

Table 6: Common risk factors highlighted by the health workers

Risk factors	Frequencies	Percentage (%)
Insufficient/inadequate protective equipment	39	43.3
Lack of national infection control policies	17	18.9
Overcrowding of patients	13	14.4
Understaffing	13	14.4
Inadequate hygiene conditions	8	8.9
Total	90	100

According to the study, 43.3% of the respondents identified that insufficient/inadequate protective equipment is the most common factor contributing to the risk of acquiring a nosocomial infection. This was followed by lack of national infection control policies with 18.9% (17), then overcrowding of patients and understaffing with 14.4% (13) each and lastly inadequate hygiene conditions with only 8.9% (8).

4.4 Infection Control Practices Used by health Workers and their Compliance with These Practices

When the health workers were interviewed on the prevention of NIs, 100% of the respondents felt that most of the NIs are completely preventable if the infection control measures are properly used.

Table 7: IC measures most commonly used by health workers to prevent NIs

Control measures	Frequencies	Percentage (%)
Use of protective gears	22	24.4%
Hand hygiene	20	22.2%
Sterilization	20	22.2%
Proper waste disposal	17	18.9%
Surface sanitation	11	12.2%
Total	90	100

Most health workers emphasized on use of protective equipment like gloves and aprons, hand hygiene, sterilization, proper waste disposal with sanitization being the least commonly used.

Figure 4: Distribution of respondents by the frequency of using protective gears

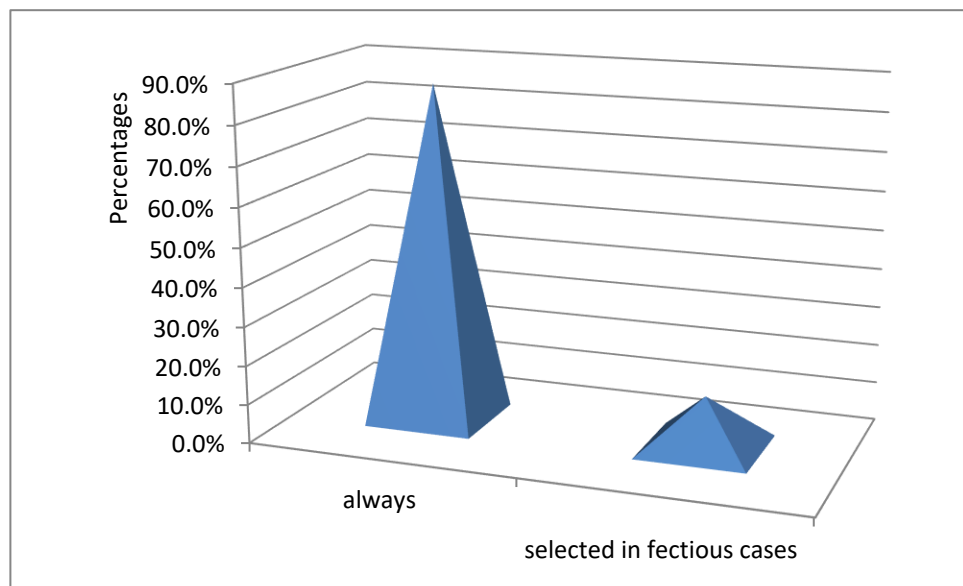


Figure 4 above shows that majority of the respondents did use protective gears always when caring for a patient 86.7% (78) while a few 13.3% (12) did so only on selected infectious cases like HIV, HBV patients.

Table 8: IC practices easy to use most of the time

Easy-to-use Infection control measure	Frequency	Percentage (%)
Performing hand hygiene	44	48.9
Contact precautions(gloves and gowns)	39	43.3
Airborne isolation requirements	7	7.7
Total	90	100

Most health workers 44(48.9%) found performing hand hygiene as the most easy-to-use infection control method. This was followed by use of contact precautions like gloves and gowns with 39(43.3%), and lastly airborne isolation requirements like respirators with 7(7.7%). When asked what would motivate the health workers to comply with these infection control practices, 90% of the respondents emphasized on personal safety as the first choice before patient safety.

Table 9: Reasons for non compliance with IC practices

Reasons for non compliance	Frequency	Percentage (%)
Lack of infection control policy guidelines	39	43.3
Inadequate supplies	45	50
Insufficient time	6	6.7
Total	90	100

According to the study, 43.3% (39) of the respondents gave lack of infection control policy guidelines as the reason for non compliance, 50 % (45) gave inadequate supplies and lastly 6.7 % (6) gave insufficient time.

Other views of the respondents included negligence and ignorance

CHAPTER FIVE: DISCUSSION OF RESULTS

Introduction

In this chapter, the reader is introduced to detailed discussions and arguments behind the research findings of the research done at KIUTH on factors predisposing health workers to nosocomial infections at the Hospital.

Discussions

The study attracted a total of 90 health workers, with males (53.3%) being slightly more than the females (46.7%). The respondents ranged in the ages of 21 and above with majority being nurses probably due to their availability within the hospital at all times. The findings established that most of the respondents were youthful employees with few years of experience (since 74.5% of respondents had been at the hospital for less than 5 years) in implementing infection prevention protocol in a hospital setting.

The study found out that participants' knowledge concerning the various aspects of HCAIs was generally high and consistent with current scientific evidence since the vast majority were aware of what these infections are, some of the examples of these infections that a HCW can acquire from a patient and the standard precautions. Most of the respondents obtained this information during their educational courses (77.8%).

The common examples of HCAIs in the hospital mentioned by the respondents were RTIs, HIV and HBV. This is in relation to a study published by CDC in conjunction with WHO (2002) in which these infectious diseases (of which TB and HIV dominate) were found to be endemic in Africa where Uganda is found and so the turn up of patients to hospitals in this region with these

infections is high. RTIs however took the lead and these mainly included TB with 42.9%, nosocomial pneumonia with 35.1% and cough/flu with 22%. This is because most HCWs (80%) are aware that NIs are mainly transmitted through contact yet some of these infections can be acquired through droplet transmission especially the RTIs. The risk is made worse by the unpopular use of airborne isolation requirements within the hospital which is only 7.7%.

All the participants were able to establish that a HCW is at risk of acquiring a NI. They were able to highlight the most common risk factors within the hospital and some of them included; Insufficient/inadequate protective equipment like respirators (43.3%) and lack of national infection control policies (18.9%). This is similar to the findings of the study of Dr Allengrazi Benedetta in conjunction with WHO on HCAIs in developing countries which also found out that inadequate/insufficient equipment and lack of national policies and programmes are among the conditions leading to higher HCAI burden in developing countries.

Another key finding was that the attitudes towards HCAIs are encouraging, since a high percentage of respondents reported positive global and specific beliefs. In particular, 56.7% indicated that guidelines should be established and followed.

According to the study, most of the respondents believed that HCAIs can be prevented by observing infection control measures and the measures commonly used in the hospital include use of protective equipment like gloves and gowns (24.4%), hand hygiene (22.2%), sterilization (22.2%), proper waste disposal (18.9%) and surface sanitation (12.2%). They however also highlighted that hand hygiene and use of contact precautions were the easiest methods to use with 48.9% and 43.3% respectively while air borne isolation requirements was the least easy-to-

use method. This leaves them at risk of airborne (droplet transmitted) nosocomial infections such as TB.

Results from this study also indicate that majority (86.7%) of the respondents often or always used personal protective equipment and performed hand hygiene measures during and after clinical work respectively for the prevention of NIs. The minority (13.3%) however who did not do this always especially in emergency cases are left at a risk of acquiring NIs.

These results were similar to that of Odongkara who studied the risk of infection among HCW in Gulu and Lacor Hospitals and found out that 108 (46%) of her respondents were exposed to potentially infectious body fluids. Odongkara identified that even though staff put on personal protective equipment, 30% of injuries occur when staff were not wearing protective gear.

Majority of the respondents (90%) were motivated by personal rather than patient safety to comply with infection control guidelines because hand washing was valued more as a means of self-protection than as a means to prevent patient-to-patient transmission. However the greatest reason for non compliance was inadequate supplies with a 50% response, followed by the lack of infection control policy guidelines. This can be attributed to the fact that in such a developing country where even the basics of medical care are hard to provide, protection of health care workers does not appear on the list of health care priorities.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSION

Basing on the above study findings, it was concluded that;

- The health care workers at KIUTH have a high level of awareness on aspects concerning nosocomial infections.
- The most common risk factors for exposure or acquiring a nosocomial infection are insufficient/inadequate protective equipment and lack of infection control policy guidelines.
- RTIs are the most common health care associated infections occurring among the health workers at KIUTH.
- In a university/teaching hospital like this that usually functions as referral hospital and accepts patients requiring more complex care, such hospitals generally report higher rates of exposure to infections.
- Being a hospital in a developing country, changing infection control practices will require a multifaceted approach that addresses resource availability, occupational safety, and not only local understanding and attitudes about infection control amongst the health workers.

6.2 RECOMMENDATIONS

This study recommended that;

- Health care providers at the hospital should be provided with adequate and relevant personal protective equipment and advised on appropriate use. Supervision and monitoring of use of these equipments should be strengthened.
- Ongoing medical education and training for staff on health care associated infections and their control/prevention should be made available and should emphasise on task-specific needs for safety to maintain the competency of the HCWs.
- The government in conjunction with the hospital administration should emphasise on infection prevention and control policies in the various departments.

REFERENCES

- Allegranzi Benedetta, Pittet Didier. Infection Control Hospital Epidemiology 2007;28: pages 1323-27
- Clements C, Halton K, Graves N, et al. Overcrowding and understaffing in modern health-care systems: key determinants in meticillin-resistant Staphylococcus aureus transmission, 2008; 8: pages 427-34.
- Jain SK, Persaud D, Perl TM, et al. (July 2005). "Nosocomial transmission mechanisms and saline flush Emerging Infectious Diseases. **11** (7): pages 1097–9.
- Morbidity and Mortality Weekly Report, Recommendations of the Healthcare Infection Control Practices October 25, 2002 / Vol. 51 / No. RR-16 Centers for Disease Control and Prevention
- "Occupational Exposure to Bloodborne Pathogens; Needlestick and Other Sharps Injuries; Final Rule. Chapter 66 pages 5317-5325". Osha.gov. Retrieved 2011-07-11.
- Otter JA, French GL (January 2009). "Survival of nosocomial bacteria and spores on surfaces and inactivation by hydrogen peroxide vapor". J. Clinical Microbiology Pages: 205–7.

- Pittet D, Allegranzi B, Storr J, et al. Infection control as a major World Health Organization priority for developing countries. *J Hospital Infections* 2008; 68(4) pages 285-92
- Pittet D, Donaldson L. Clean Care is Safer Care: a worldwide priority. *Lancet* 2005; 366 pages 1246-7 *Bulletin of the World Health Organization* 2011; 89: pages 757-765.
- Prevalence of occupational exposure to HIV among health workers in Northern Uganda. Odongkara BM, Mulongo G, Mwetwale C, Akasiima A, Muchunguzi HV, Mukasa S, Turinawe KV, Adong JO, Katende J.
- Ramirez JA. Controlling multiple-drug-resistant organisms at the hospital level. *Expert Opin Pharmacother* 2006; 7(11): 1449-55.
- Rotter M. Hand washing and hand disinfection [Chapter 87]. In: Mayhall CG, ed. *Hospital epidemiology and infection control*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins, 1999. Denton GW. Chlorhexidine [Chapter 16]. In: Block SS, ed. *Disinfection, sterilization and reservation*. 4th ed. Philadelphia, PA: Lea and Febiger, 1991
- Sagoe-Moses C, Pearson RD, Perry J, Jagger J. Risks to health care workers in developing countries. 2001; 345: pages 538–41.
- World Alliance for patient safety. *WHO Guidelines on Hand Hygiene in Health Care*. 2009

- Williams WW. CDC guideline for infection control in hospital personnel. Infection Control 1983; 4: pages 326-49.

APPENDIX 1

Research Questionnaire

I (name)year student of medicine and surgery invite you to participate in the study on factors predisposing health workers to nosocomial infections at KIUTH Ishaka municipality Bushenyi District.

The objective of this study is to determine the factors that predispose health care workers to nosocomial infections at this hospital. .

You will be asked for personal information such as your age as well as your occupational characteristics. The information that you provide during the study is totally confidential and will not be disclosed to anyone. Only the researchers and assistants will have access to them and they will only be used for research purposes. Your name is not required

Your participation in this study is voluntary and if there is anything that is unclear or you need further information, I shall be delighted to provide it.

I agree.....

I decline.....

Tick the correct answer and write where necessary.

Section A: Demographic characteristics of respondent

1. Gender

a) Male ()

b) Female ()

2. Age

a) 15 - 20 ()

b) 21 – 30 ()

c) 31 – 40 ()

d) >40 ()

3. Marital status.

a) Single ()

b) Married ()

c) Separated ()

4. Cadre of Health worker

- a) Doctor ()
- b) Nurse ()
- c) Clinical Officer ()
- d) Lab Personnel ()
- e) Others.....

5. Years of service at KIUTH

- a) 0 - 2 ()
- b) 3 - 5 ()
- c) >5 ()

Section B: Knowledge on nosocomial infections.

1. Do you know something about nosocomial infections?

- a) Yes ()
- b) No ()

2. Where did you obtain the information from?

a) Educational courses ()

b) Scientific journals ()

c) Colleagues at work ()

d) A workshop/training ()

3. What are nosocomial infections?

a) Infection involving the nose ()

b) Health care associated infections ()

c) Air-borne transmitted infections ()

4. What are the common examples of nosocomial infections you know?

.....
.....

5. The most frequent mode of transmission of nosocomial infections is;

a) Contact transmission ()

b) Airborne transmission ()

c) Common vehicle transmission ()

5. What are your beliefs towards nosocomial infections?

.....
.....

Section D: Infection control practices used by health workers and their compliance with these practices.

1. Do you feel that most of the nosocomial infections are preventable?

a) Yes ()

b) No ()

2. Which infection control measures are commonly used at your place of work?

a) Hand washing ()

b) Use of gloves, aprons ()

c) Surface sanitation ()

d) Sterilization ()

e) Proper waste disposal ()

3. How often do you use protective equipment like clean gloves, gowns or aprons when attending to a patient?

a) Always ()

b) On selected infectious cases ()

4. Do you wash hands or use alcohol-based hand rubs after removal of gloves and between patients?

a) Yes ()

b) No ()

If yes, why.....

5. Which infection control practice is easy to use most of the time?

a) Performing hand hygiene ()

b) Contact precautions (gloves & gowns) ()

c) Airborne isolation requirements (masks) ()

Others (specify).....

6. What would motivate you to comply with infection control guidelines?

a) Patient safety ()

b) Personal safety ()

7. What is the reason for non compliance with these practices?

a) Inadequate supplies ()

b) Lack of infection prevention & control guidelines ()

c) Insufficient time ()

Others (specify).....

Thank you participating

APPENDIX 2

RESEARCH PROPOSED BUDGET

S/N	Item	Quantity	Unit price/ugx	Amount/ugx
1	Note books	4	1,500	6000
2	Pens	10	500	5000
4	Research assistant	2	10,000	20,000
5	Research supervisor/consultation	1	100,000	100,000
6	Typing and printing questionnaires	1copy	1,000	1000
7	Photocopying questionnaires (4 pages)	100 copies	400	40,000
8	Typing and printing reports	1copy	5,000	5,000
9	Photocopying reports	3copies	5,000	15,000
10	Miscellaneous	20%		38,400
	TOTAL			230,400

